FORMULA & CONVERSION SHEET FOR COLLECTION SYSTEM

CONVERSIONS

1 psi	=	2.31 ft. of head
1 ft. of head	=	0.433 psi
1 cuft of water	=	7.48 gallons
1 cuft of water	=	62.4 lbs.
1 gallon	=	8.34 lbs.
1 gallon	=	3,785 ml
1 Liter	=	1,000 ml
1 Liter	=	1,000 grams
1 mg/L	=	8.34 lbs/MG
1 ppm	=	1 mg/L
1 ml	=	1 gram
1 pound	=	453.6 grams
1 pound	=	7,000 grains
1 kilogram	=	1,000 grams
1 cuft/sec	=	448.8 gpm
1 MGD	=	1.55 cuft/sec
1 MGD	=	694.5 gpm
1 HP	=	33,000 ft.lbs./min
1 HP	=	745 kilowatt
1 cubic yard	=	27 cubic feet

FLOW AND VELOCITY

"Q" = FLOW expressed in cubic ft per sec. (cfs)

"V" = VELOCITY expressed in ft per second (fps)

"A" = AREA expressed in square feet (sqft)

$$Q = A \times V$$
$$V = Q \div A$$
$$A = Q \div V$$

Standard Design Criteria
0.17 lbs BOD5 per/ per day
0.20 lbs TSS per/ per day
0.0048 lbs phosphorus per/per/day
100 gal per/per day

SLOPE	=	$\dfrac{\text{FALL IN FEET}}{\text{LENGTH IN FEET}}$
GRADE	=	$\dfrac{\text{RISE IN FEET}}{\text{RUN IN FEET}}$
VELOCITY	=	$\dfrac{\text{DISTANCE TRAVELED IN FEET}}{\text{TIME REQUIRED IN SECONDS}}$
DIFFERENCE IN ELEVATION	=	% GRADE X PIPE RUN IN FT
PUMP RATE/GPM	=	$\dfrac{\text{INFLUENT RATE – RISE}}{\text{RATE WITH PUMP RUNNING}}$
PUMP RATE/GPM	=	$\dfrac{\text{VOLUME}}{\text{TIME}}$
PERCENT FLOW	=	$\dfrac{\text{ACTUAL FLOW}}{\text{AVERAGE FLOW}}$
DETENTION TIME	=	$\dfrac{\text{VOLUME (GALS)}}{\text{FLOW (GPM)}}$
KILOWATTS	=	HORSEPOWER x 0.746
KILOWATT HOURS	=	$\dfrac{\text{KILOWATTS USED x HRS}}{\text{OPERATED}}$
POWER COST	=	KILOWATT HRS USED x COST/KILOWATT

OBJECT	AREA (ft2)	VOLUME (ft3)
Rectangle	Length' x Width'	Length' x Width' x Height'
Circle	.785 x D' x D'	
Triangle	1/2 (Base' x Altitude')	
Cylinder		.5236 x D' x D' x D'
Sphere		.785 x D' x D' x Length'

Diameter (D) = 2 x Radius   Circumference = 3.1416 x D   Perimeter = Sum of all sides

LBS.

FLOW/MGD

CONCENTRATION
MG/L

8.34
LBS/GAL
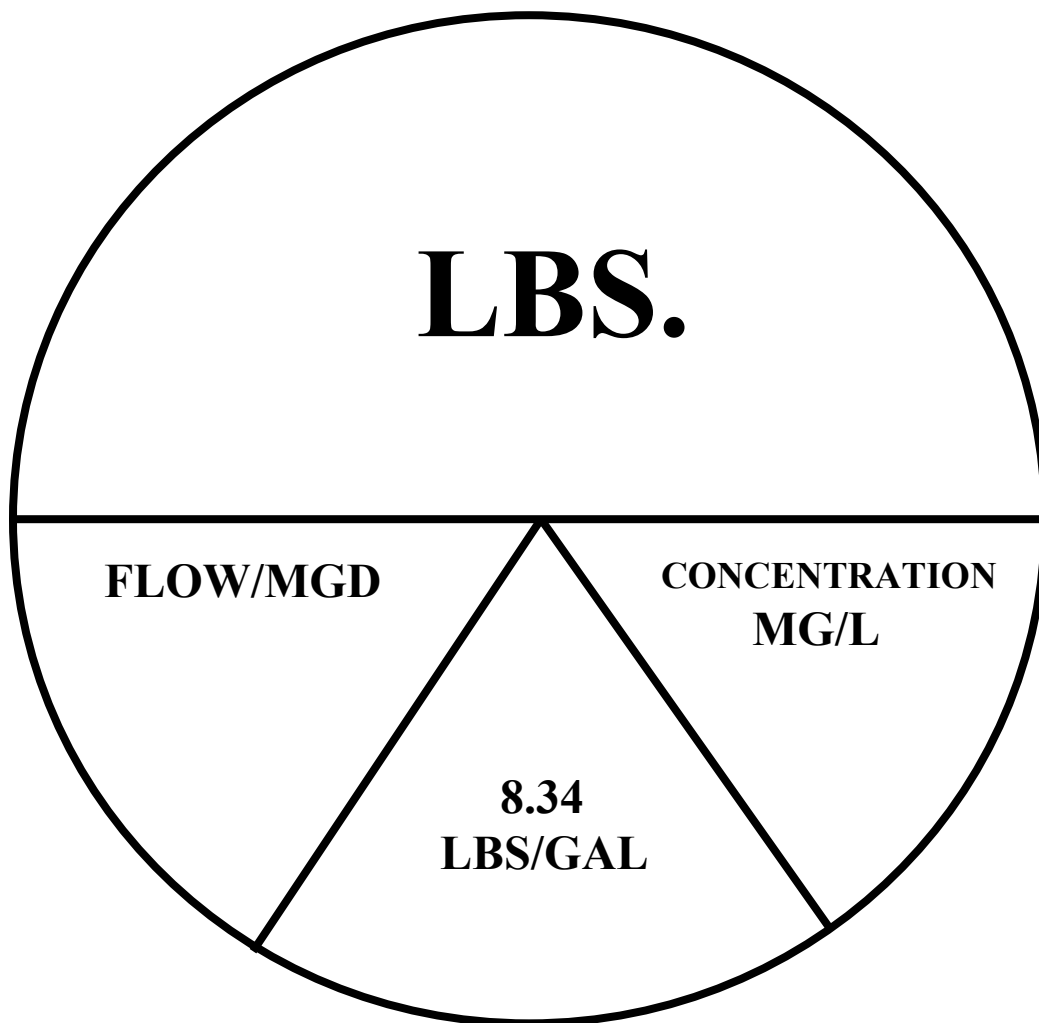
Lbs./day = Flow/MGD X 8.34 X Concentration mg/l

Concentration mg/l = Lbs./day ÷ Flow/MGD X 8.34

Flow/MGD = Lbs./day ÷ Concentration mg/l X 8.34